

IN THE CLAIMS:

1. An alpha-amylase for processing grain, the alpha-amylase derived from *Bacillus acidocaldarius*, having low pH performance and producing a starch liquefact from grain, the liquefact free of maltulose and suitable for conventional saccharification processes without chemical additions or pH adjustment.
- 5 2. An alpha-amylase derived from *Bacillus acidocaldarius* for liquefying starch, the alpha-amylase following a single low temperature liquefaction process producing a starch liquefact free of maltulose, having a pH of about 4.0-4.5, a DE of about 10-12 and having inactivated alpha-amylase that does not adversely affect saccharification enzymes.
- 10 3. A process for producing glucose from starch comprising the acts of:
 - a) providing a mixture of a starch slurry having a pH as low as 3.0 and an thermostable, acid-stable alpha-amylase capable of hydrolyzing starch at a pH as low as 3.0, the alpha-amylase cultured from *Bacillus acidocaldarius*;
 - b) liquefying the starch slurry by heating the mixture until a DE of about 10-12 is reached without the production of maltulose; and
 - c) adding a saccharification enzyme to the liquefied starch slurry from step b) and maintaining a resulting saccharification mixture at about 60° C for between about 10-48 hours or until about a 95% glucose yield is achieved.
- 15 4. The process of claim 3 wherein act a) is carried out without adjusting the pH of the starch slurry.
- 20 5. The process of claim 3 wherein act a) is carried out without adding a calcium salt.
6. The process of claim 3 wherein act a) is carried out without adjusting the pH of the starch slurry and without adding a calcium salt.
- 25 7. The process of claim 4 wherein act b) further comprises heating the mixture at about 105-110° C for 5-8 minutes.

8. The process of claim 7 wherein act c) is carried out without inactivating the alpha-amylase and without adjusting the pH of the liquefied starch slurry.
9. The process of claim 8 wherein act c) further comprises adding glucoamylase to the liquefied starch slurry.
- 5 10. The process of claim 8 wherein act c) further comprises adding a mixture of glucoamylase and pullulanase to the liquefied starch slurry.
11. A product produced by the process of claim 8.